

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application. Applicant adds new claims 34-43 and amends the claims as follows:

1. (Currently Amended) A synthetic microsphere, comprising:
a synthetic, substantially spherical wall comprising an aluminosilicate material;
wherein the microsphere has a particle diameter of greater than about 30 microns, wherein the microsphere comprises ~~about 6~~ 12.8 wt.% to 40 wt.% aluminum oxide, ~~about~~ 5.2 wt.% to 30 wt.% calcium oxide, and about 4 to less than about 10 wt.% sodium oxide, wherein the microsphere has [[an]] a total alkali metal oxide content of less than about 10 wt.%, based on the weight of the microsphere.
2. (Previously Presented) The synthetic microsphere of Claim 1, wherein the substantially spherical wall defines at least one inner void, wherein the at least one inner void is synthetically formed by a pre-determined amount of a blowing agent.
3. (Original) The synthetic microsphere of Claim 2, wherein the blowing agent is selected from the group consisting of powdered coal, carbon black, graphite, carbonaceous polymeric organics, oils, sugar, starch, polymeric organic oils, polyvinyl alcohol, carbonates, carbides, sulfates, sulfides, nitrides, nitrates, glycol, glycerine, and combinations thereof.

4. (Original) The synthetic microsphere of Claim 2, wherein the at least one inner void has a volume of between about 30-95% of the aggregate volume of the microsphere.

5. (Previously Presented) The synthetic microsphere of Claim 1, wherein the synthetic substantially spherical wall further comprises a binding agent.

6. (Previously Presented) The synthetic microsphere of Claim 5, wherein the binding agent is selected from the group consisting of alkali metal silicates, alkali metal aluminosilicates, alkali metal borates, alkali or alkaline earth metal carbonates, alkali or alkaline earth metal nitrates, alkali or alkaline earth metal nitrites, boric acid, alkali or alkaline earth metal sulfates, alkali or alkaline earth metal phosphates, alkali or alkaline earth metal hydroxides, sugar, ultra fine fly ash, Class C fly ash, Class F fly ash, colloidal silica, inorganic silicate cements, and combinations thereof.

7. (Cancelled)

8. (Original) The synthetic microsphere of Claim 1, wherein the microsphere is formulated to be substantially chemically inert in a caustic environment having a pH of about 12-14.

9. (Cancelled)

10. (Original) The synthetic microsphere of Claim 1, further comprising an aspect ratio of between about 0.8 and 1.

11. (Original) The synthetic microsphere of Claim 1, further comprising a wall thickness of between about 1 to 100 microns.

12. (Original) The synthetic microsphere of Claim 1, wherein the particle density of the microsphere is between about 0.1 and 2 g/cm³.

13. (Original) The synthetic microsphere of Claim 1, wherein the bulk density of the microsphere is less than about 1.4 g/cm³.

14-18. (Cancelled)

19. (Previously presented) The synthetic microsphere of Claim 1, wherein the mass ratio of silica to alumina is greater than unity.

20. (Previously presented) The synthetic microsphere of Claim 1, wherein the average particle diameter of the microsphere is between about 30 and 1000 microns.

21. (Previously presented) The synthetic microsphere of Claim 1, wherein the average particle diameter of the microsphere is between about 50 and 300 microns.

22. (Previously presented) The synthetic microsphere of Claim 1, wherein the aluminosilicate material is calcined.

23. (Previously presented) The synthetic microsphere of Claim 1, wherein the aluminosilicate material is derived from fly ash.

24. (Currently Amended) A plurality of synthetic microspheres comprising:

12.8 wt.% to 40 wt.% aluminum oxide, 5.2 wt.% to less than about 10 wt.% sodium oxide, and an alkali metal oxide content of less than about 10 wt% based on the total weight of the microspheres, wherein the synthetic microspheres are formulated to have a pre-selected average particle diameter of greater than about 30 microns, wherein the synthetic microspheres are formulated with aluminosilicate particles having a pre-selected average particle size range of about 0.01 to 50 microns.

25-26. (Cancelled)

27. (Original) The synthetic microspheres of Claim 24, wherein each synthetic microsphere has a substantially spherical outer wall defining a synthetically formed, substantially enclosed cavity therein.

28. (Currently Amended) A formulation for forming a synthetic microsphere, comprising:

a primary component comprising at least one aluminosilicate component having a particle diameter pre-selected to form a microsphere with a particle diameter greater than about 30 microns;

at least one chemical, wherein the at least one chemical comprises a binding agent that substantially binds the particles

of the primary component together so as to form a precursor to make the synthetic microspheres;

wherein the primary component and the at least one chemical each having a sufficiently low or no alkali metal oxide content so as to maintain the alkali metal oxide content of the synthetic microsphere to less than about 10 wt.% and comprising 12.8 to 40 wt.% aluminum oxide and about 4 to less than about 10 wt.% sodium oxide based on the weight of the microsphere.

29. (Original) The formulation of Claim 28, further comprising a blowing agent, wherein the blowing agent can be combined with the primary component and the binding agent in a manner such that when activated, the blowing agent releases a gas that expands the precursor so as to form a substantially spherical wall enclosing a cavity therein.

30. (Original) The formulation of Claim 29, wherein the primary component comprises fly ash and the blowing agent is selected from the group consisting of carbon black, powdered coal, sugar, silicon carbide.

31. (Original) The formulation of Claim 29, wherein the primary component comprises basalt and the blowing agent is selected from the group consisting of carbon black, powdered coal, sugar, and silicon carbide.

32. (Original) The formulation of Claim 28, wherein the at least one chemical is selected from the group consisting of alkali metal silicate, alkali metal aluminosilicate, alkali

metal borate, alkali or alkaline earth metal carbonates, alkali or alkaline earth metal nitrite, boric acid, alkali or alkaline earth metal sulfates, alkali or alkaline earth metal nitrate, alkali or alkaline earth metal phosphates, alkali or alkaline earth metal hydroxides, sugar, starch, ultra fine fly ash, class C fly ash, class F fly ash, colloidal silica, inorganic silicate cements, organic polymers and combinations thereof.

33. (Original) The formulation of Claim 29, wherein the blowing agent is substantially the same as the binding agent.

Please add new Claims 34-43 as follows:

34. (New) A microsphere produced by a process comprising:
providing an agglomerate precursor having at least
an aluminosilicate component and a blowing agent;
firing the agglomerate precursor at a temperature between
600°C and 2500°C, wherein the firing seals the surface of
the agglomerate precursor; and
activating the blowing agent to form the microsphere.

35. (New) The microsphere of claim 34, wherein the firing step
is performed in an apparatus selected from the group of a
fluidized bed reactor, a vortex furnace, a heated vertical pipe,
and a fuel fired furnace.

36. (New) The microsphere of claim 34, wherein the firing step
further comprises firing the precursor for a period of about
0.05 to 20 seconds.

37. (New) The microsphere of claim 34, wherein the firing step comprises forming a molten skin around the precursor.

38. (New) The microsphere of claim 34, wherein the activating the blowing agent comprises liberating a blowing gas by one or more processes selected from the group of combustion, evaporation, sublimation, thermal decomposition, gasification and diffusion.

39. (New) The microsphere of claim 38, wherein the blowing gas is substantially trapped inside the molten skin.

40. (New) The microsphere of claim 38, wherein the blowing gas is selected from the group consisting of CO₂, CO, O₂, N₂, N₂O, NO, SO₂, H₂O, and mixtures thereof.

41. (New) The microsphere of claim 34, further comprising drying the precursor to a moisture level of less than about 14 wt.%.

42. (New) The microsphere of claim 34, wherein the agglomerate precursor has a total alkali metal oxide content of about 10 wt.% or less.

43. (New) The microsphere of claim 34, wherein the blowing agent comprises 0.05 to 10 wt.% of the agglomerate precursor.